

QUARTERLY SUMMARY

OF THE

IMPROVEMENTS AND DISCOVERIES

IN THE

MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

1. *Minute Anatomy of the Liver*.—Dr. LIONEL S. BEALE has published (*Med. Times and Gaz.*, July 20, 1856) several interesting lectures on this subject. The following is a summary of the most important points brought under notice:—

"The livers of all vertebrate animals are penetrated in every part by two sets of channels, which alternate with each other. One series, *portal canals*, contains a branch of the portal vein, hepatic artery, and hepatic duct, *interlobular*; and the other series, *hepatic venous canals*, is occupied by a single branch of the hepatic vein, *intra-lobular*.

"The vessels ramifying in the portal canals are ultimately distributed in such a manner that they serve to divide the organ into little masses, and thus map out spaces, or *lobules*, each of which contains all the structural elements of the organ, and may be regarded as an elementary liver.

"In the intervals between the fissures by which the portal vein, artery, and duct are conducted to the lobule, its capillary vessels and its secreting structure are continuous with those of adjacent lobules.

"The size and form of the lobules differ much in different animals; but their essential structure is the same in all, except in the pig, in the Polar bear, according to Müller, and in the *Ocotodon Cummingii* (one of the rodents), according to Hyrtl.

"In the pig each lobule is provided with a separate fibrous capsule of its own, and is, therefore, completely isolated from its neighbours. The portal vessels, artery, and duct run between them, and give off branches to contiguous lobules. In the intervals between the fibrous capsules areolar tissue can frequently be demonstrated.

"In all cases, upon a section, the lobule is seen to be bounded externally by branches of the vein, artery, and duct, and in the centre is situated a small branch of the hepatic vein.

"In the liver of the human subject, and in that of vertebrate animals generally, with the exceptions above mentioned, the lobules are not separated from each other by any fibrous partition, and there is no areolar tissue or prolongation of Glisson's capsule between them, or in their interior.

"The vessels at their entrance into the liver, and as they run for some distance in the larger portal canals, are surrounded with much areolar tissue; but the disposition of this texture about the vessels of the liver is very similar to its arrangement about the vessels distributed to other organs.

"The *lobule* itself is composed of a solid capillary network, and of another network composed of a delicate tubular membrane, in which the liver cells are contained.

"These networks mutually intertwine with each other.

"The capillary network is directly continuous with the smallest branches of the portal vein, distributed upon the circumference of the lobule on the one hand, and with the small intralobular vein arising in its centre upon the other. The vessels of the network converge towards the intralobular vein.

"Small branches of the artery open into the venous capillaries of the lobule, near its circumference, and the diameter of these small branches is considerably less than that of the venous capillaries into which they open; the former not more than the 1-4000th of an inch in diameter, the latter about the 1-1600th.

"In all cases, the blood, enriched with constituents recently absorbed from the intestine, flows with a gradually increasing rapidity from the circumference of the lobule towards its centre, while the bile flows in a precisely opposite direction.

"The cell-containing network is directly continuous with the most minute ducts, which ramify at the circumference of the lobule, and it terminates in the centre by loops, which lie close to the intralobular vein.

"The liver-cells lie within a tubular network of basement membrane, which separates them from the walls of the capillaries. In many cases, however, these thin membranes cannot be separated, and are, no doubt, incorporated with each other.

"The cells are not attached to the basement membrane of the tube, but lie in its cavity. Among them free oil globules and granular matter are often found. Usually, there is only room for one row of cells, but sometimes two or more lie across the tube. In the embryo, in young animals, and in fishes, there is room for several rows to lie transversely across the tubes of the cell-containing network.

"The cells near the margin of the lobule take the most active part in the formation of bile. The secretion passes along the tubes in the slight interstices between the cells and the basement membrane, and coloured fluid can be forced along these same interstices in a direction the opposite to that in which the bile flows during life, and, therefore, at a great disadvantage. The amount of space is in great measure determined by the quantity of blood in the vessels, and it is liable to great alteration.

"The secreting tubes of the network are many times wider than the narrow thin-walled ducts with which they are directly continuous.

"The smallest ducts are lined with a very delicate layer of epithelium, composed of flattened cells of a circular form, contrasting remarkably with the large secreting cells, which are not arranged in any definite manner within the tubes of the network.

"The tubes of the cell-containing network are about the 1-1000th of an inch in diameter, or more, but the finest ducts are not more than 1-3000th, and they are often seen even less.

"The smallest ducts in some animals branch very freely, and the branches communicate with each other at intervals. In others they pursue a long course without branching, and in the pig they form an intimate network upon the surface of the lobule. In fatty livers of the pig, however, this ductal network often contains liver cells loaded with oil globules.

"As the ducts increase in size they are provided with a fibrous coat, and the epithelium in their interior becomes columnar.

"The *interlobular ducts* do not anastomose.

"When the fibrous coat reaches a certain degree of thickness, it contains numerous little cavities or *sacculi*, arranged entirely round the tube in the pig and in most animals, but forming two parallel rows, one on either side of the duct, in the human subject.

"These little *sacculi* often communicate with each other in the coats of the duct. The smaller branches of the duct also anastomose frequently either in the coats of the duct or just external to them.

"The *sacculi* appear to serve the purpose of bringing the bile in the thick walled ducts into closer relation with the vessels which surround them, and especially with the branches of the artery which are distributed to their coats.

"In the transverse fissure of the human liver and some others, and in the

large portal canals, are found some peculiar branches of the duct, *vasa aberrantia*, with numerous sacculi on their walls, which anastomose with each other and form a network.

"In the same localities in the human subject, and in the gall-bladder; a very peculiar arrangement of the vessels occurs. Both arteries and veins form a network, and each branch of the artery is accompanied with two branches of the vein, one on either side of it.

"The vertebrate liver is to be regarded as a true gland, its secreting structure consisting of a *formative portion* taking the form of a network, and of a system of very narrow *efferent ducts* directly continuous with it. The secreting cells lie within a delicate tubular network of basement membrane, through the thin walls of which they draw from the blood the materials of their secretion, and they are thus brought into closer relation with, and are more nearly surrounded by the blood than the cells of any other secreting gland."

2. *The True Spinal Marrow the True Sympathetic.*—Dr. MARSHALL HALL maintains (*Lancet*, July 12, 1856) that the true spinal marrow is the true great sympathetic, or rather the great dienergetic nerve of the general system, whilst the ganglionic intra and extra-ganglionic system are its branches.

"Since," he says, "the promulgation of the diastaltic nervous system, of which the true and real centre is the spinal marrow and the spinal marrow only, two mistakes have been committed; the first was, to ascribe a similar function to the cerebrum; the second, to ascribe a reflex power to the ganglia. The former error arose from confounding the effect of *emotion* with those of the excitants of diastaltic action; the latter was, I believe, a mistake without foundation of any kind.

"If we see a disgusting object, we experience an emotion which may issue in sickness and vomiting, as other emotions issue in sickness and vomiting. But who does not instantly perceive the difference between this psychological fact and the vomiting induced by the physical excitement of the fauces, for example?

"Of an instance of a reflex action through the medium of the ganglionic system, the spinal centre being intercepted, not a trace has been discovered.

"Is there, in effect, any fact of a physical direct or reflex action, excited from or through the substance of the cerebrum, freed from its membranes; or of any part of the ganglionic system, the spinal centre being removed? I believe not. To speak, then, of reflex actions of the cerebral or of the ganglionic systems, is to confound things essentially distinct, and unwarrantably to extend the use of terms recently introduced and well defined.

"The great experimental question is this: When the cerebral and the spinal centres are removed, is there any possibility of inducing any phenomena such as those which have for ages been denominated *sympathetic*? This question has never been proved or discussed fully and distinctly. It might be resolved in the following manner:—

"The spinal marrow may be partially and even entirely divided in reptiles, the low-feeding and low-breathing fishes, and very young animals. This being accomplished, every means of inducing effects on the remaining functions is to be tried. If such effects be produced, it must be through the ganglionic nerve; if such effects be impossible, it must be because the real centre of reflex action is absent.

"I have destroyed the whole cerebrum and spinal marrow in frogs, carefully avoiding intra-spinal hemorrhage; but I could not afterwards influence the action of the heart, or the phenomena of the circulation, by any means I could devise.

"Still I regard the whole experimental question as requiring to be subjected to new investigation.

"I formerly regarded the diastaltic action as limited to obvious movements; but a multitude of facts show that it has a vastly more extended application.

"We all know the intimate relation between the ovary, the uterus, and the mamma. If the new-born infant be put to the nipple, contraction of the